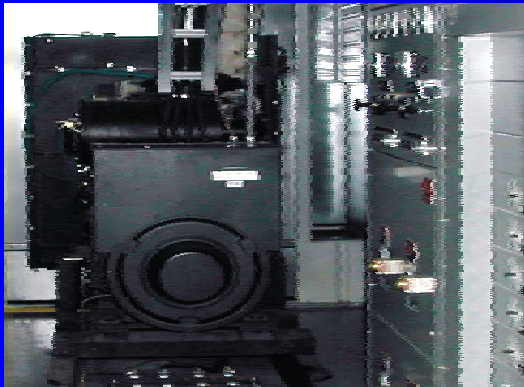




Distributed Power Generation In Alaska



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Presenters:

John Cameron & Dan Roberts

Presentation Outline

1. Precision Power LLC... Who Are We?
2. What is our interest in Distributed Generation?
3. What is Distributed Generation?
 - IEEE Definitions
 - IEEE Definitions Simplified.
4. Is Distributed Generation new?
5. Distributed Generation... Where are the savings?
6. Distributed Generation Energy Sources.
7. Some related areas.
8. Open Discussion.
 - Is there a future in Alaska for Distributed Generation?



Who Are We?

- Precision Power LLC... Who Are We?

Precision Power, LLC

5801 Silverado Way

Anchorage, AK 99518

- Over 35 Employees and Growing.

Largest Power Generation staff in the State.

Licensed Electricians

Licensed Linemen

SCADA Technicians

CD Power Systems Technicians

Engineering Services



Distributed Power Generation

Our Interest In Distributed Generation

- Manufacturing and Engineering
 - Currently Alaska's only manufacturer of complete UL Listed Custom Power Plants and Generator Sets.
 - Diesel and Gas Fired Generator Sets.
 - Extended run generator sets with over 40,000 hours.
 - Capstone Micro Turbines.
 - Solar Panel systems.
 - DC Power Systems.
 - UPS, Inverter, and Charging systems.
 - Waste Heat Recovery Systems.
 - Wind Power.
- Parts and Service
 - Power Plant Operation and Maintenance.
 - Power Generation, Transmission and Distribution.
 - Power-Buy-The-Hour



Distributed Power Generation

Distributed Generation

IEEE Definitions

- **3.1.4 distributed generation (DG):** Electric generation facilities connected to an area EPS through a PCC; a subset of DR.
- **3.1.5 distributed resources (DR):** Sources of electric power that are not directly connected to a bulk power transmission system. DR includes both generators and energy storage technologies.
- **3.1.6 electric power system (EPS):** Facilities that deliver electric power to a load.
 - **3.1.6.1 electric power system, area (Area EPS):** An EPS that serves Local EPSs.
 - **3.1.6.2 electric power system, local (Local EPS):** An EPS contained entirely within a single premises or group of premises.
- **3.3.13 point of common coupling (PCC):** The point where a Local EPS is connected to an Area EPS.

Source: IEEE 1547



Distributed Power Generation

Distributed Generation

IEEE Definitions Simplified

- What is Distributed Generation (DG) in layman's terms?
 - It is an Electrical Power Generation and Distribution System.
 - The power plants are located at the power consumer.
 - Electricity is transmitted from small remote electricity generating power plants via a grid that are not directly connected to a bulk power transmission system.
 - The electricity is sold to end consumers via electric power transmission and electrical distribution.



Distributed Power Generation

Distributed Generation

A New Concept?

- Distributed Generation is not a new concept.
 - There are generating plants throughout the “Lower 48” using diesel, wind, solar, hydroelectric, micro turbines, fuel cells and more.
 - Some hydroelectric plants have been in operation for over 100 years.
 - Many major electrical customers generate their own power in Alaska's largest oil field, Prudhoe Bay.
 - Chugach Electric has successfully tested three fuel cell installations and one micro turbine installation.



Distributed Power Generation

Distributed Generation

Where Are The Savings?

- By Generating at the Consumer:
 - The Utility Company saves 10% to 12% in plant losses.
 - There is a savings of 8% to 11% by the elimination of Transmission and Distribution losses.
 - Waste Heat can be effectively utilized to heat buildings and preheat domestic water.
 - The Utility saves money through smaller transmission lines and less generating capacity.
 - The Consumer saves by Peak Shaving.
 - The Consumer saves because of reduced costs in the production and transmission of electricity.



Distributed Power Generation

Distributed Generation Energy Sources

- Energy Sources in use today.
 - Diesel Electric Generators
 - Natural Gas and Propane Generators
 - Fuel Cells
 - Micro Turbines
 - Wind Turbines
 - Hydroelectric Power
 - Photovoltaic Cells
 - Energy Storage Devices
 - Bi-fuel Generator Sets



Distributed Power Generation

Distributed Generation Definitions

- **Peak Shaving**
 - Reduce your electric bill by reducing your maximum power demand on the utility.
 - Electric bills are based on kilowatt hours and peak utilization. By having local generating capability, the customer can start their own generator during peak hours and reduce the peak demand on the Utility. This would utilize a Prime Power or Standby rated generator set which would operate in parallel with the Utility during peak hours but would not put power out onto the grid.
- **Co-Generation**
 - **“facility in which the energy input to the facility is first used to produce useful power output, and at least some of the reject heat from the power production process is then used to provide useful thermal energy.”** Definition from FERC (Federal Energy Regulatory Commission).
- **Heat Recovery**
 - **Recovering heat normally radiated to the atmosphere during the production of electricity.**
 - There are two primary means of heat recovery. The first uses waste heat to warm buildings; typically diesel engines with a heat exchanger taking heat from the liquid coolant and running it through the building heating system. The second uses waste engine heat to generate additional electricity; for example, a gas turbine exhaust being used to produce steam, which drives a steam turbine.



Distributed Generation

Questions?



Precision Power, LLC

5801 Silverado Way
Anchorage, AK 99518
(907) 561-7797